Application of RAMMS to two extreme North American Avalanches

INTERNATIONAL SNOW SCIENCE WORKSHOP 2014

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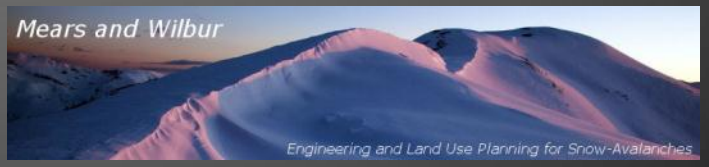
WSL

WSL-Institut für Schnee- und Lawinenforschung SLF



CASE 1

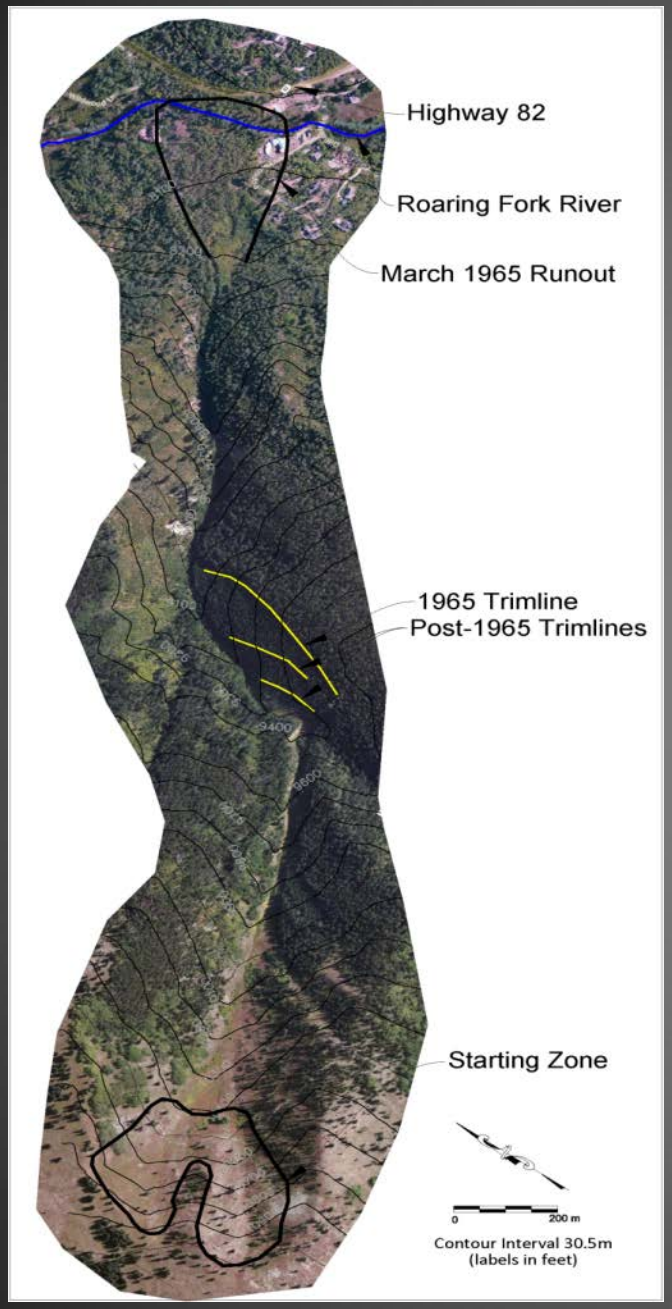
ELK MOUNTAINS, COLORADO

March 1965

CASE 2

EASTERN SIERRA, CALIFORNIA

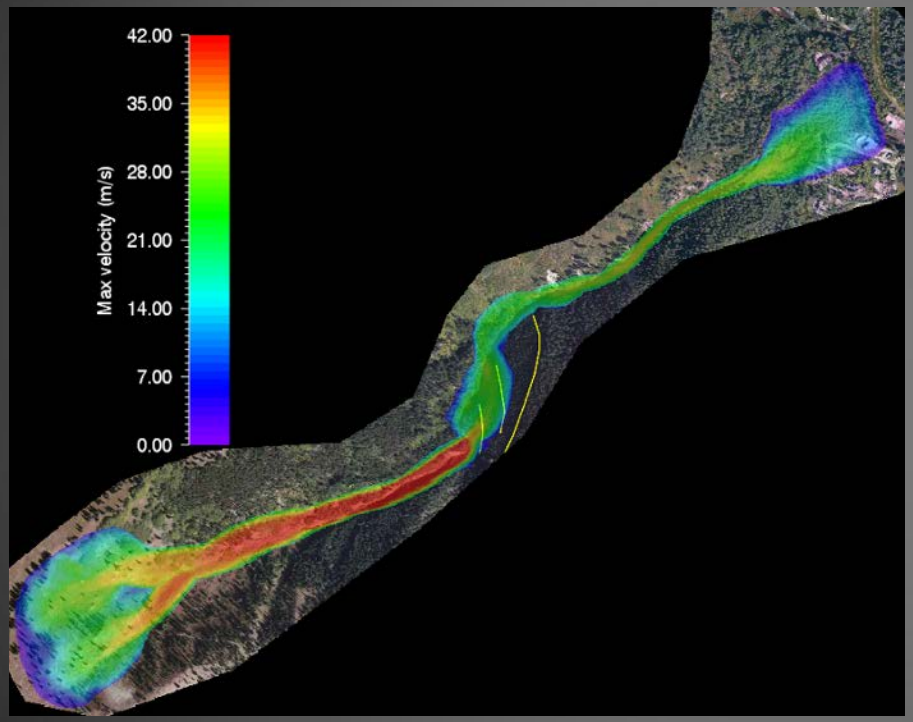
February 1986



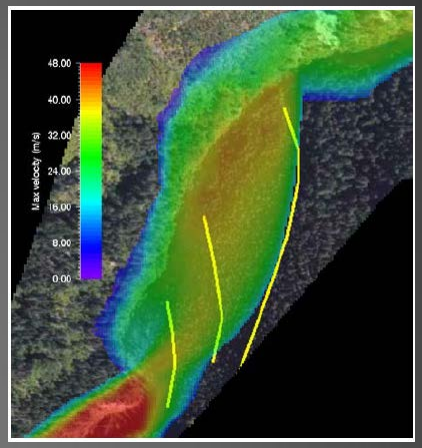
McFarlane Gulch Aspen, Colorado

- NE aspect
- 7 Hectare Fetch
- 1000+m Vertical
- Channelized Track
- Alluvial Fan Runout

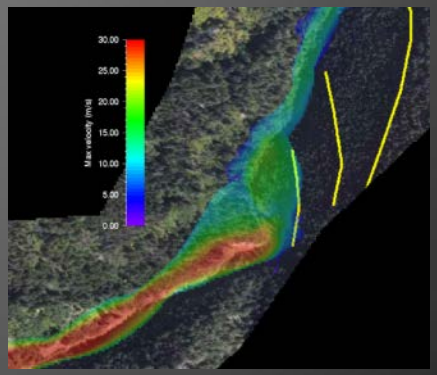
Forest Trim Lines



Release Volume 134,000 m^3

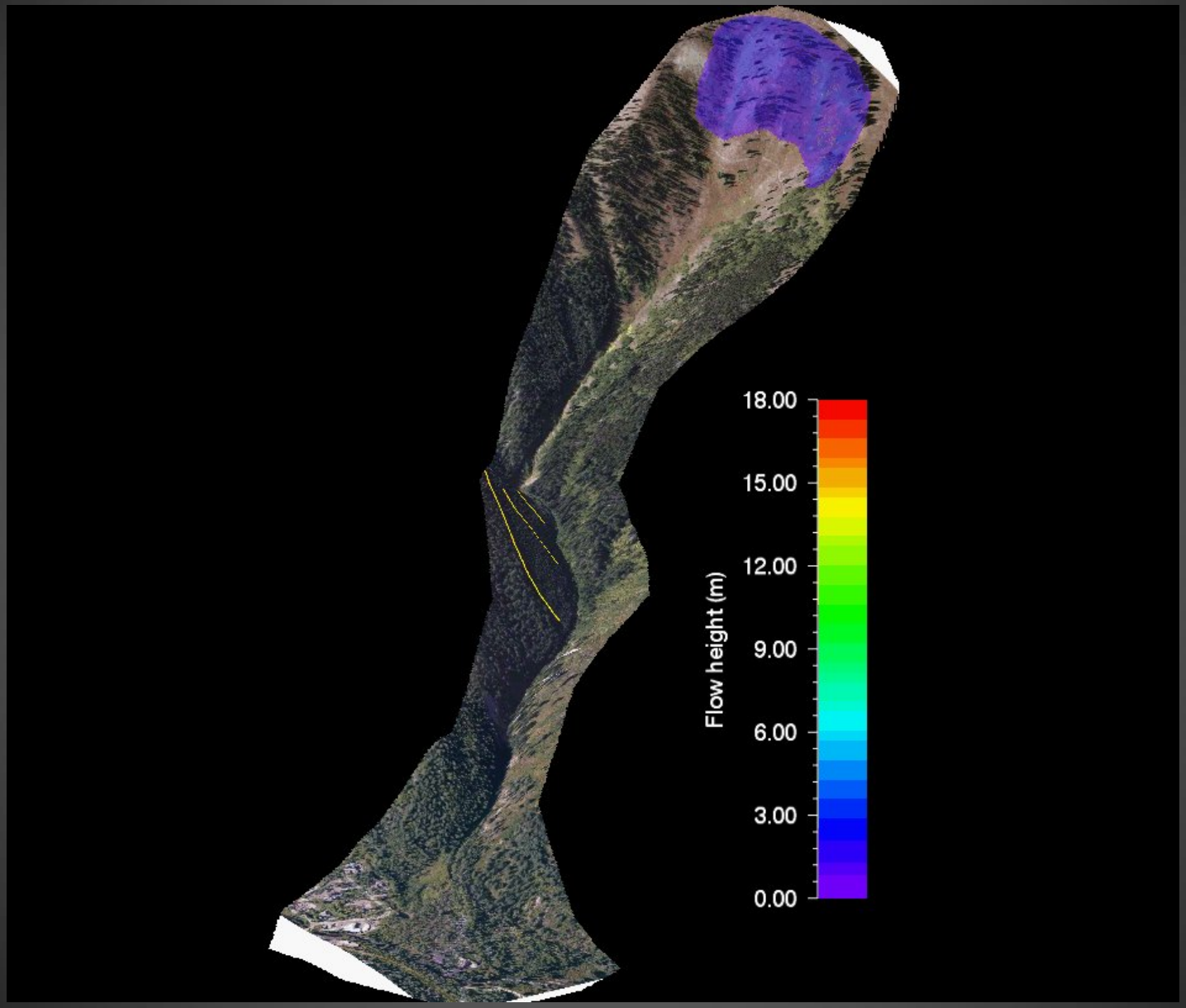


Release Volume 180,000 m^3



Release Volume 48,000 m^3

McFarlane Runout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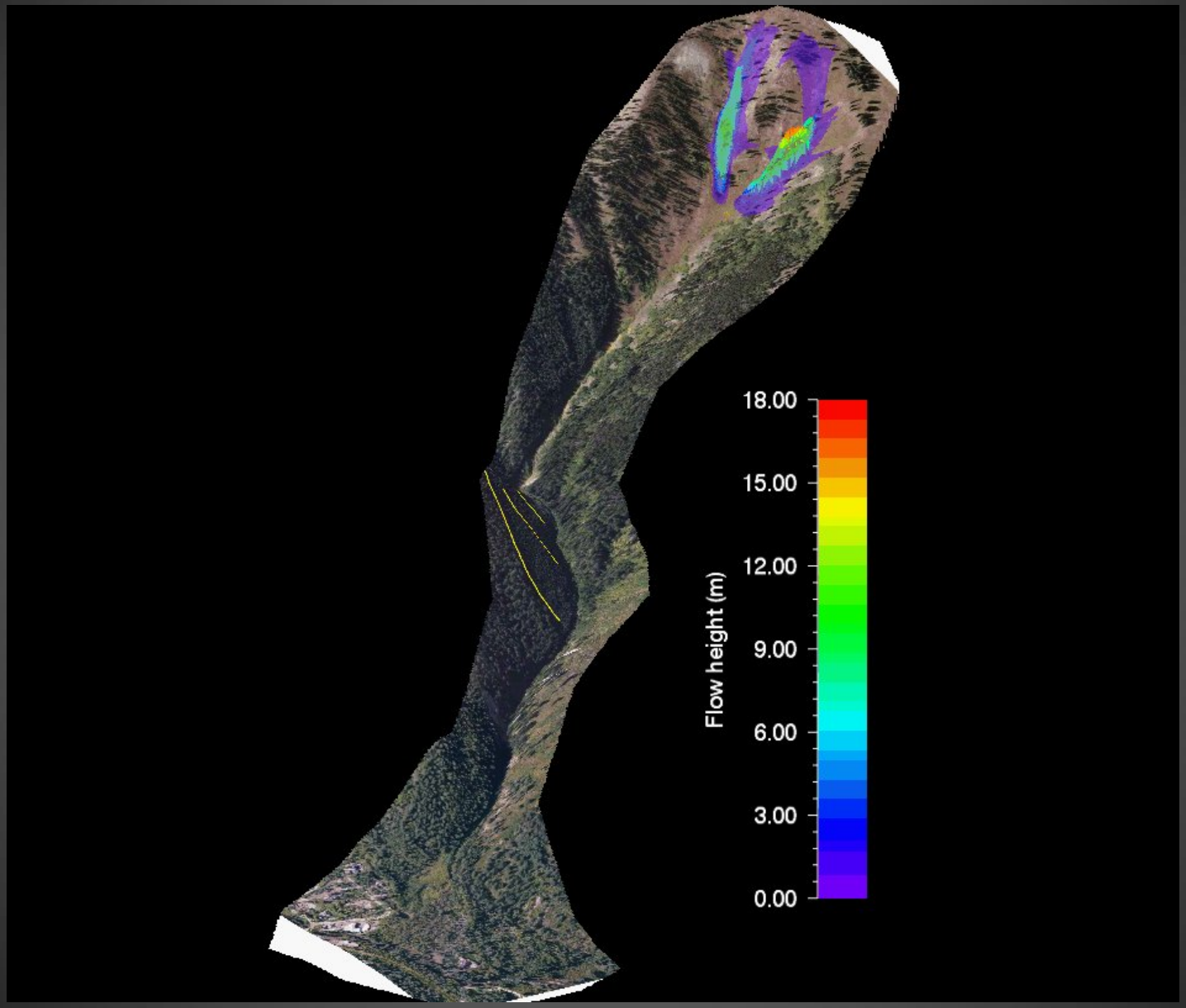
Flow height (m)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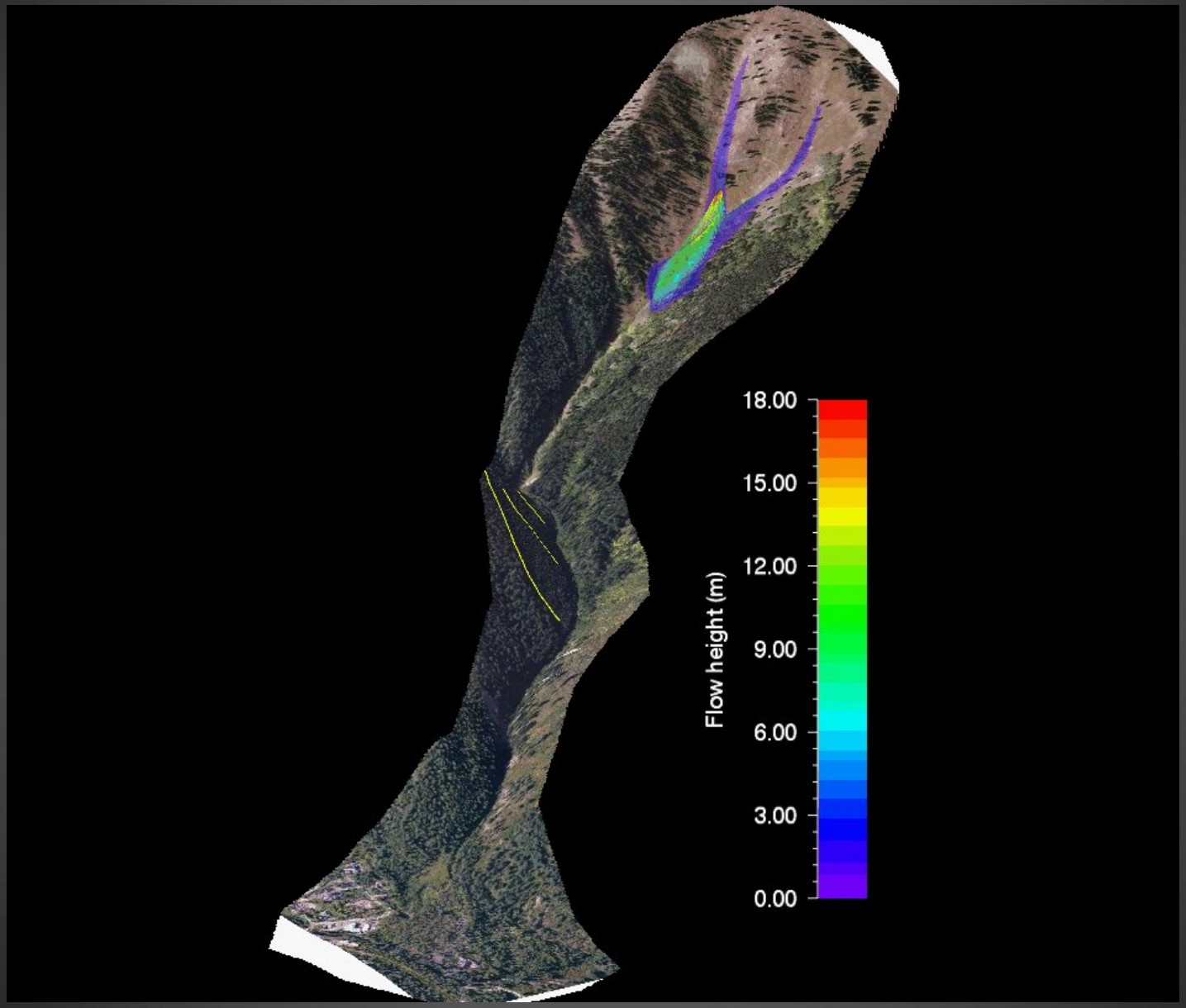
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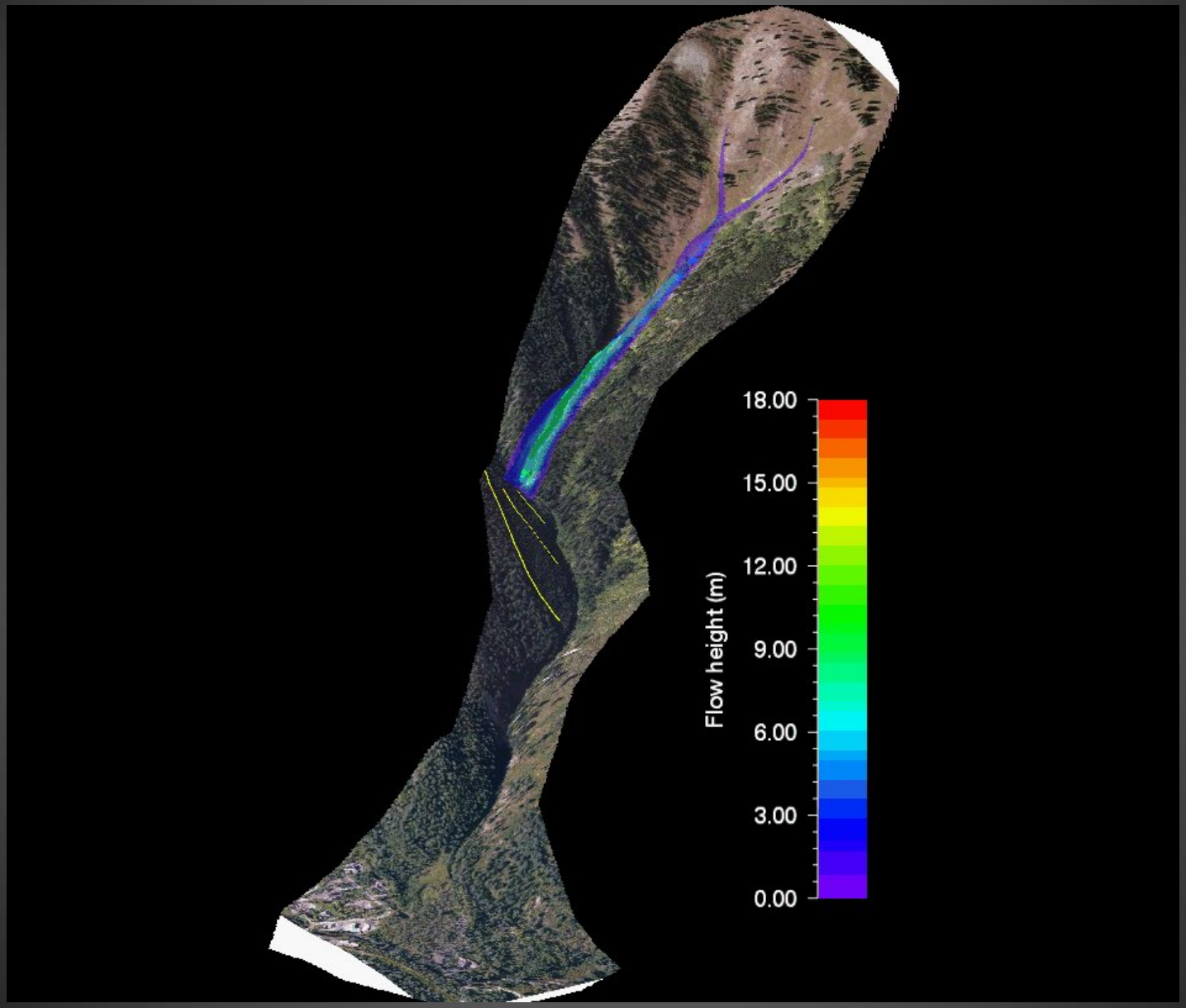
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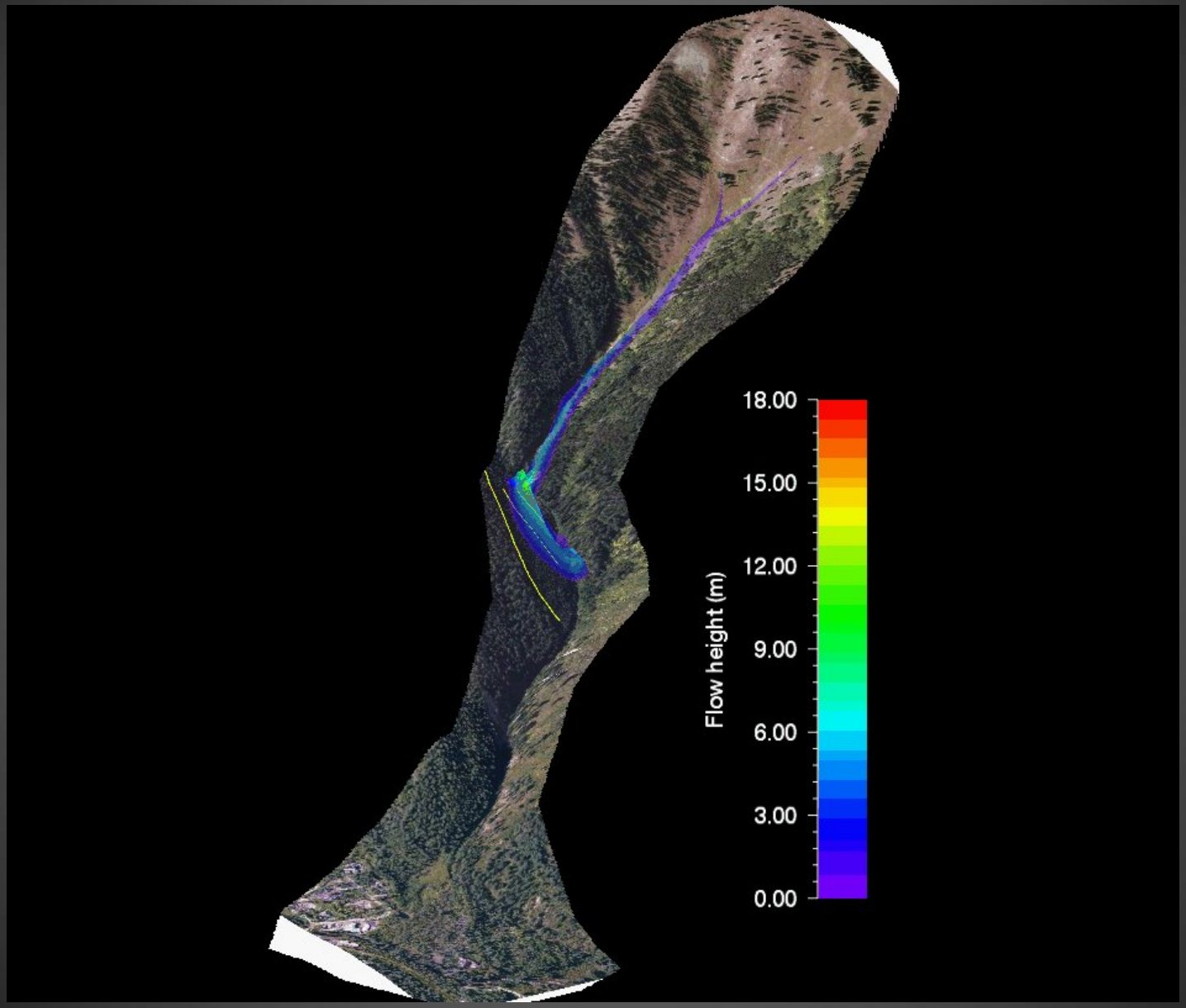
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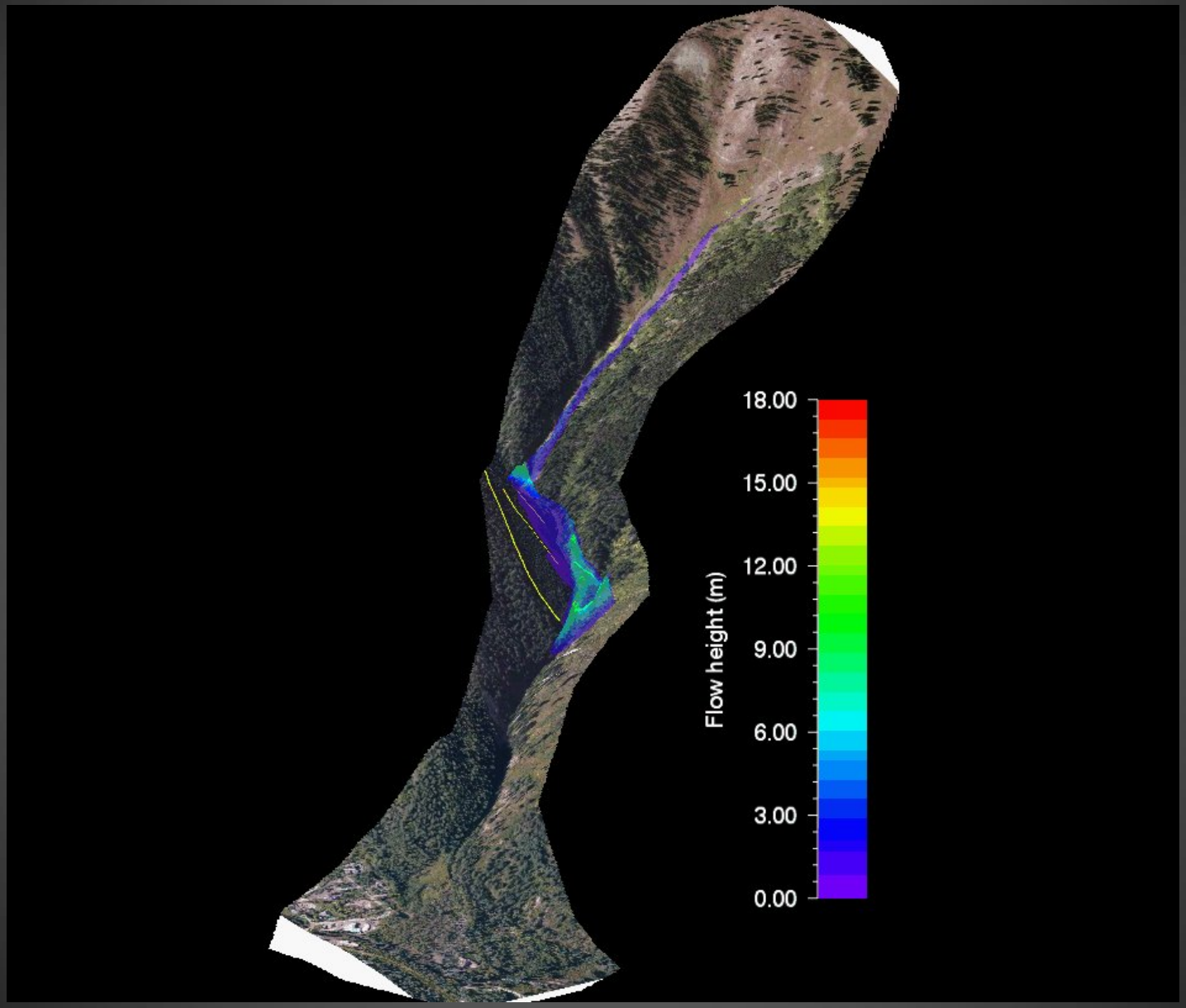
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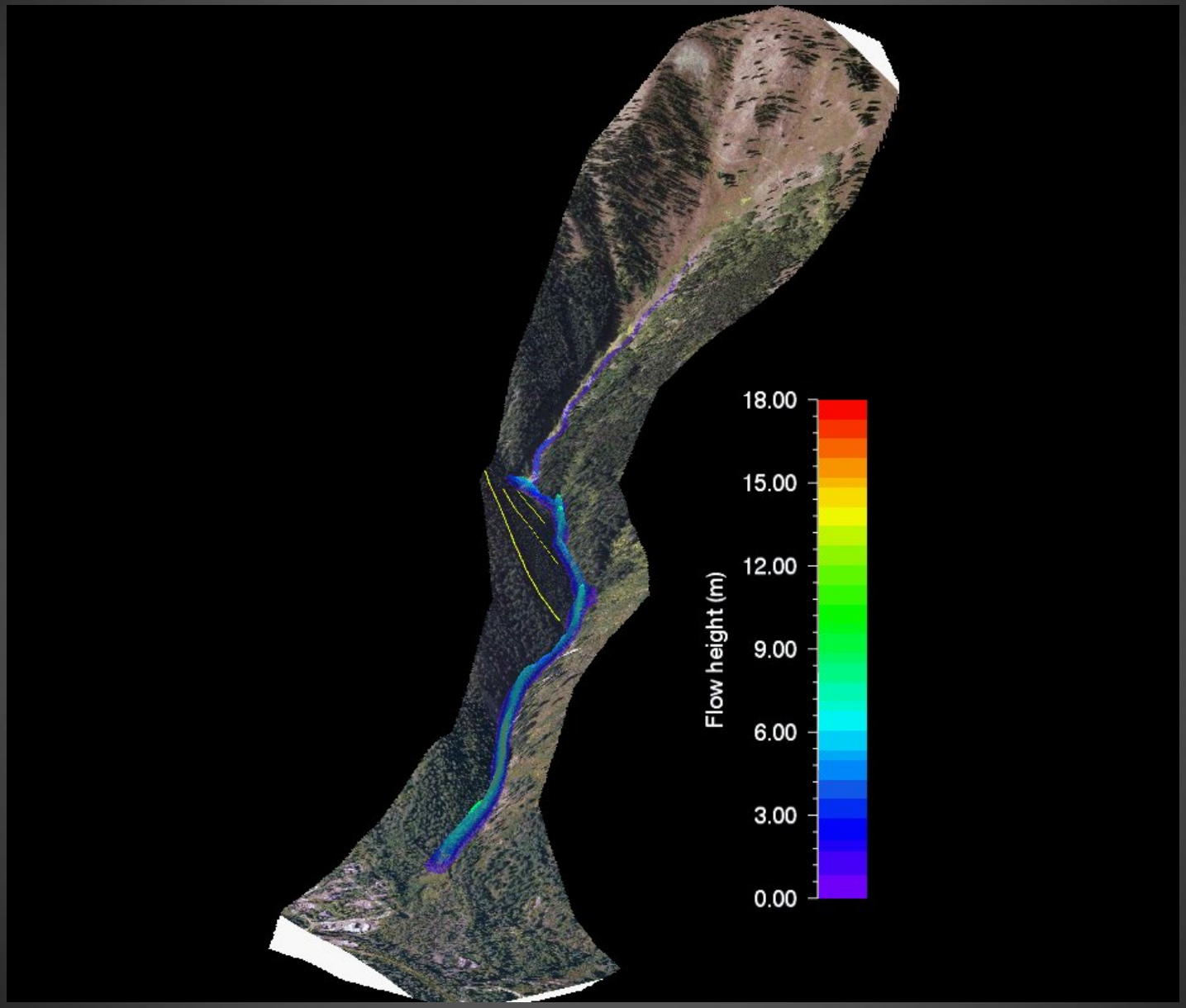
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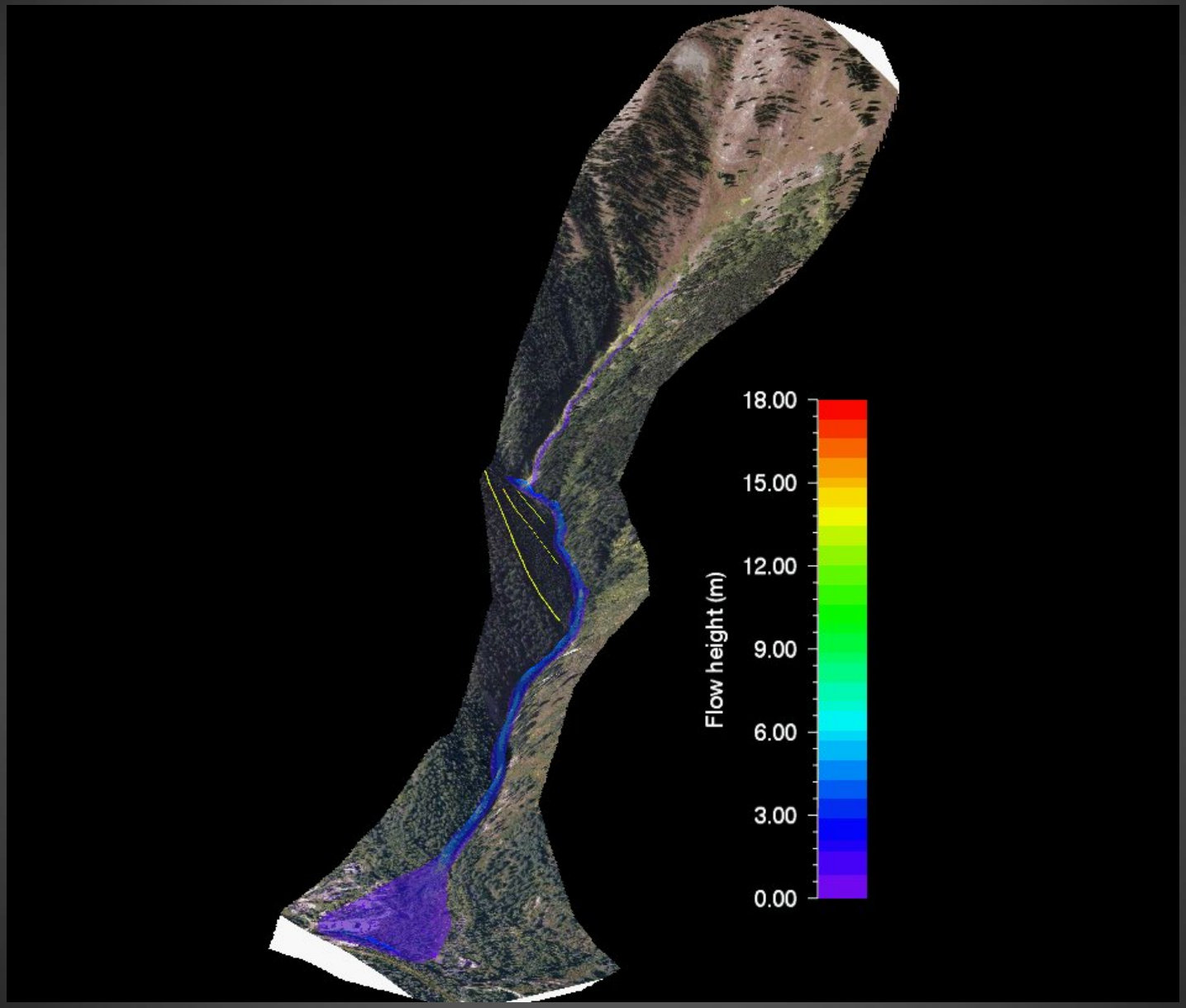
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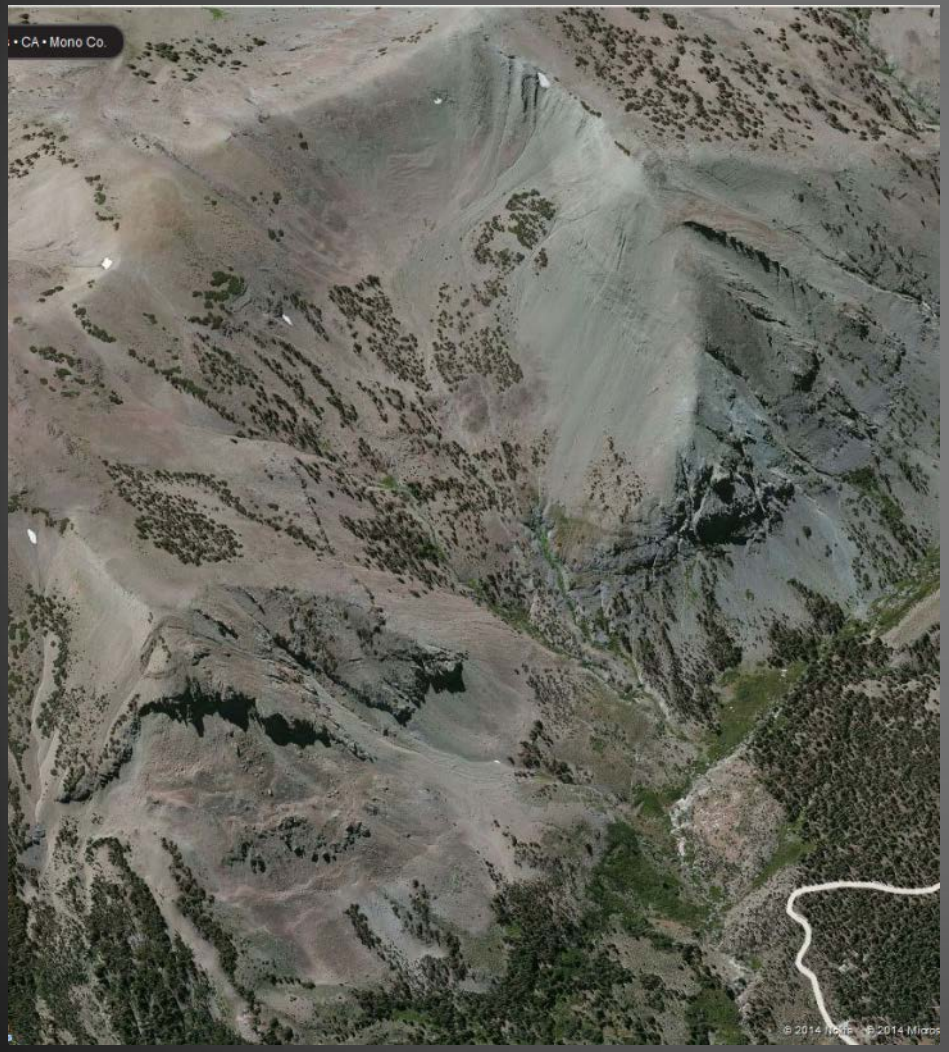
Flow height (m)

McFarlane Summary

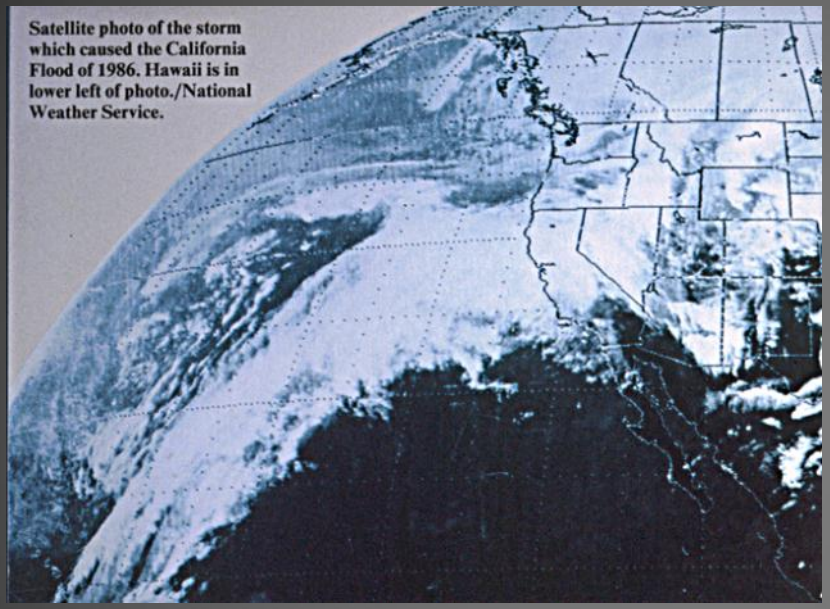
- Runout is matched closely by RAMMS
- Current development on fan
- Runup at bend not matched, because of powder avalanche

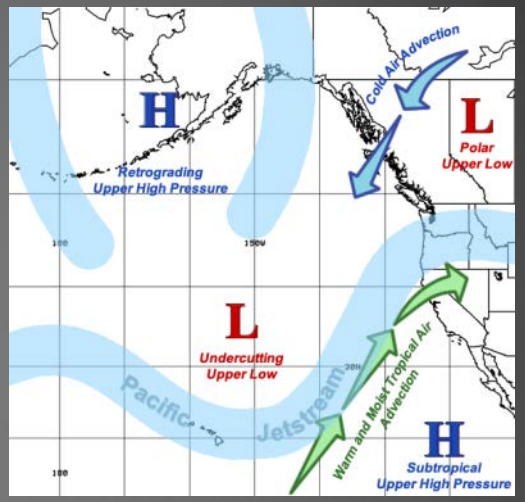
Leavitt Creek, California



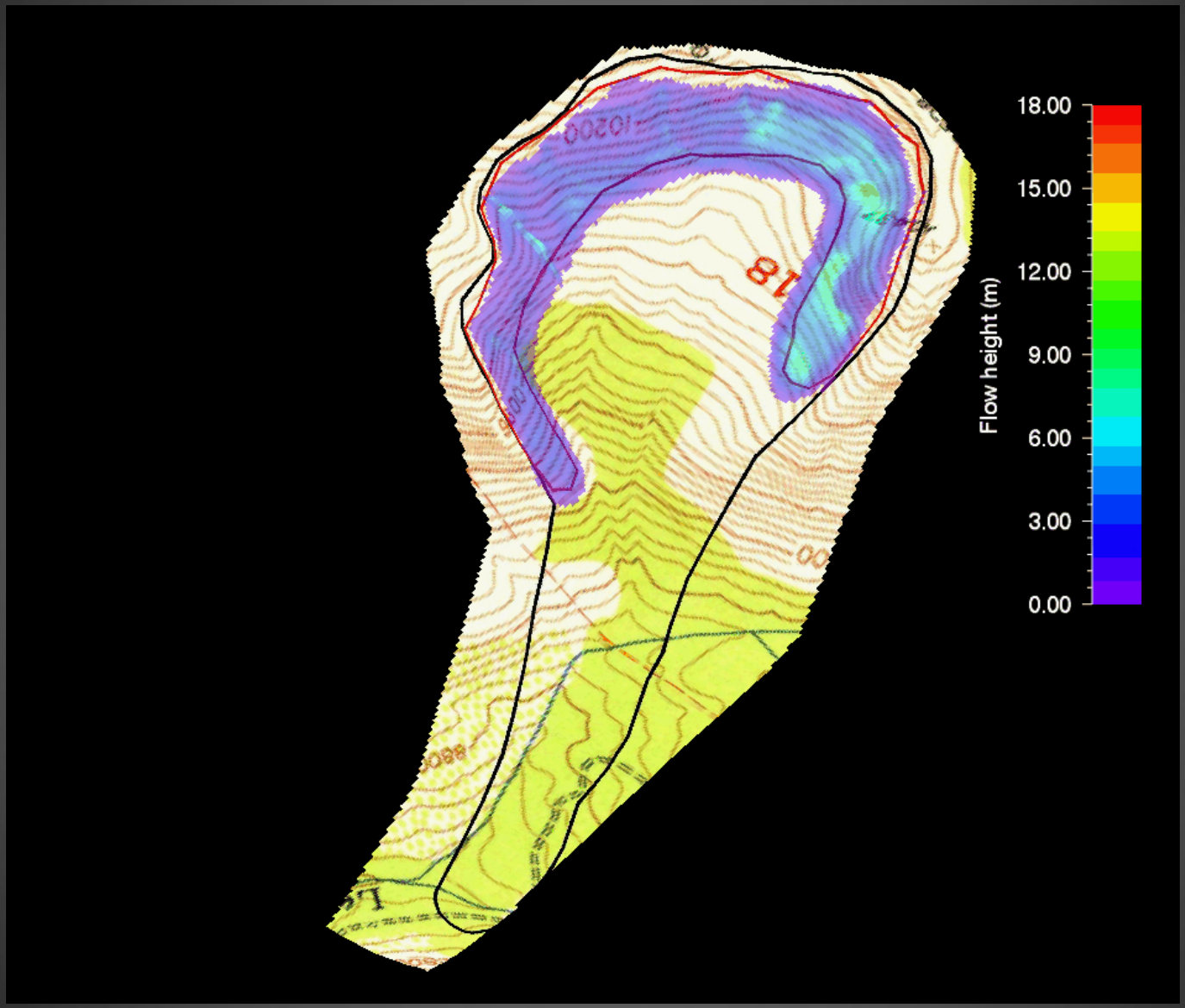
- Remote Site on National Forest
- Entire Bowl Released
- Distinct Trim line
- Mature Forest (300-yr old trees)
- Trees mostly up-rooted

February 1986 Weather





- Heavy SW flow
- 700mm SWE in 8 days at MM
- Estimate 20% greater at Leavitt
- Strong wind loading,
- very thick mean slab thicknesses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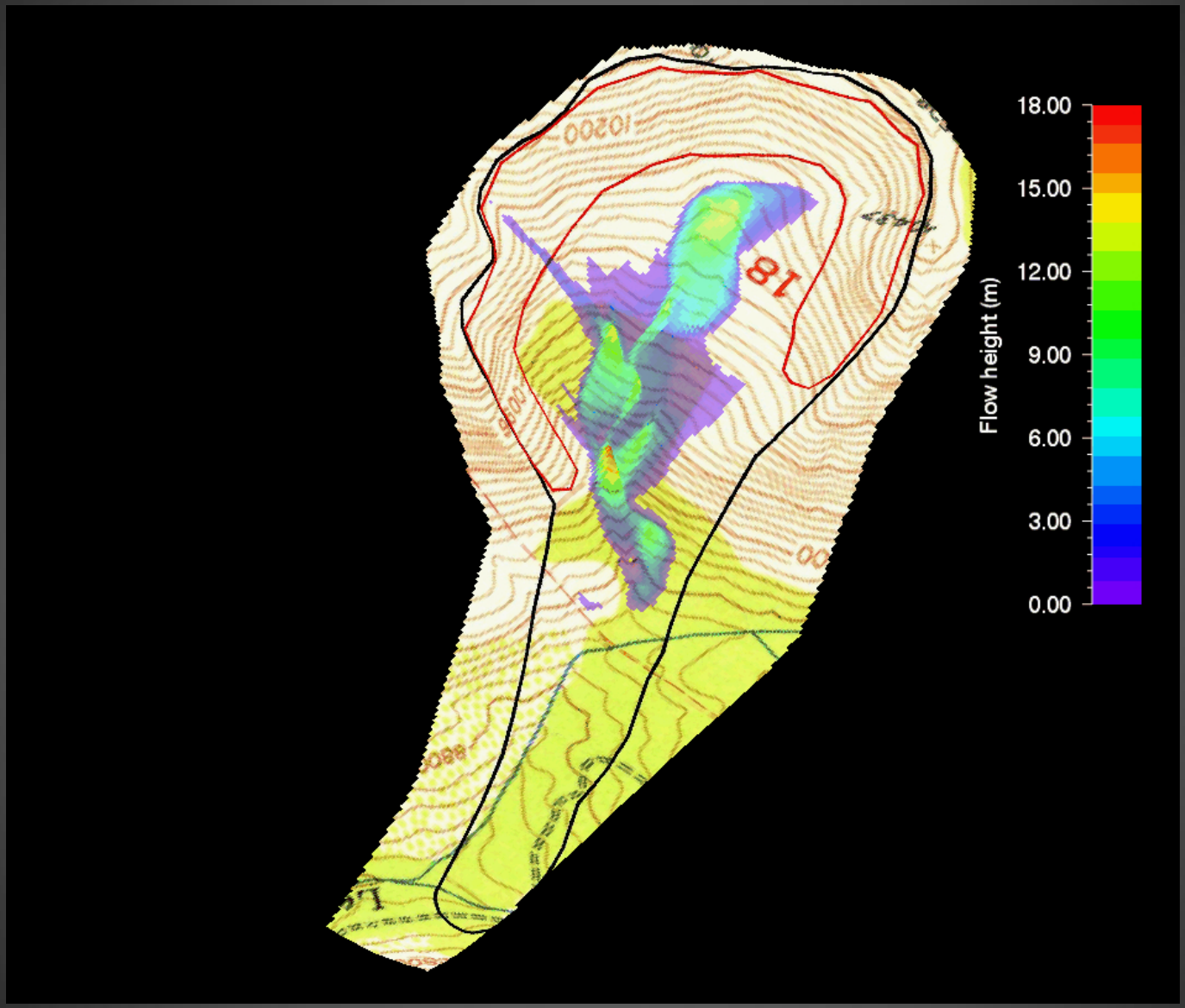
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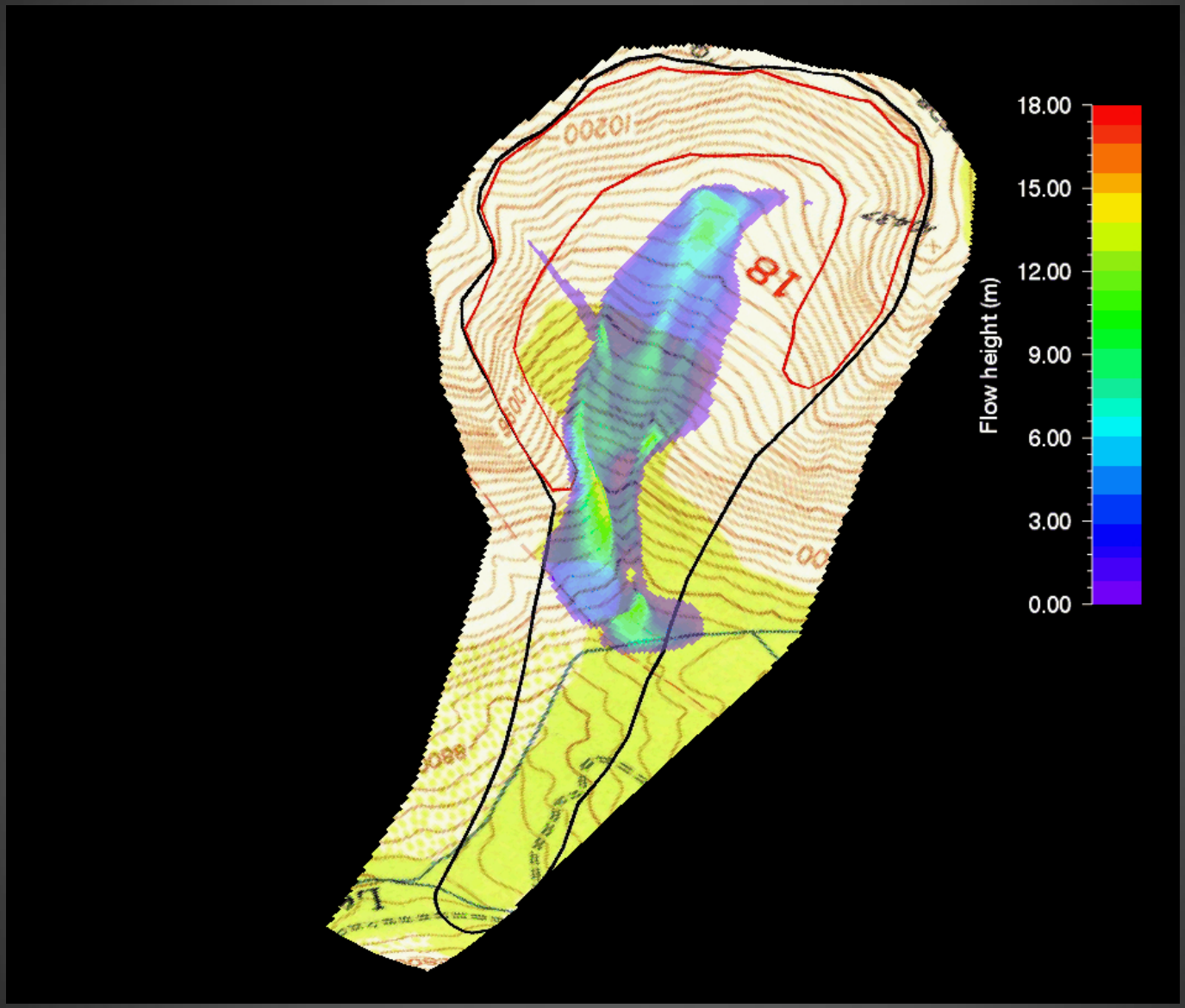
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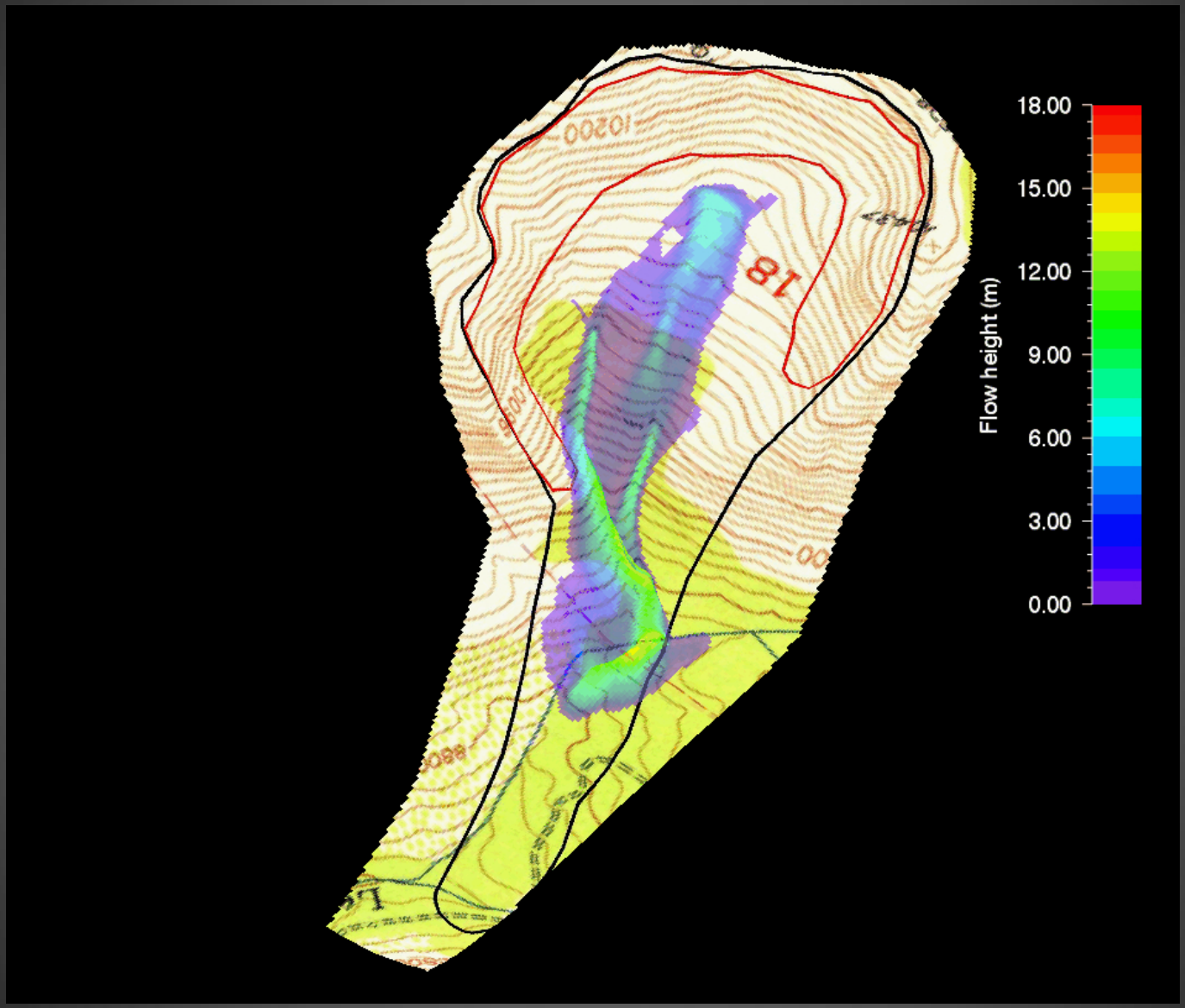
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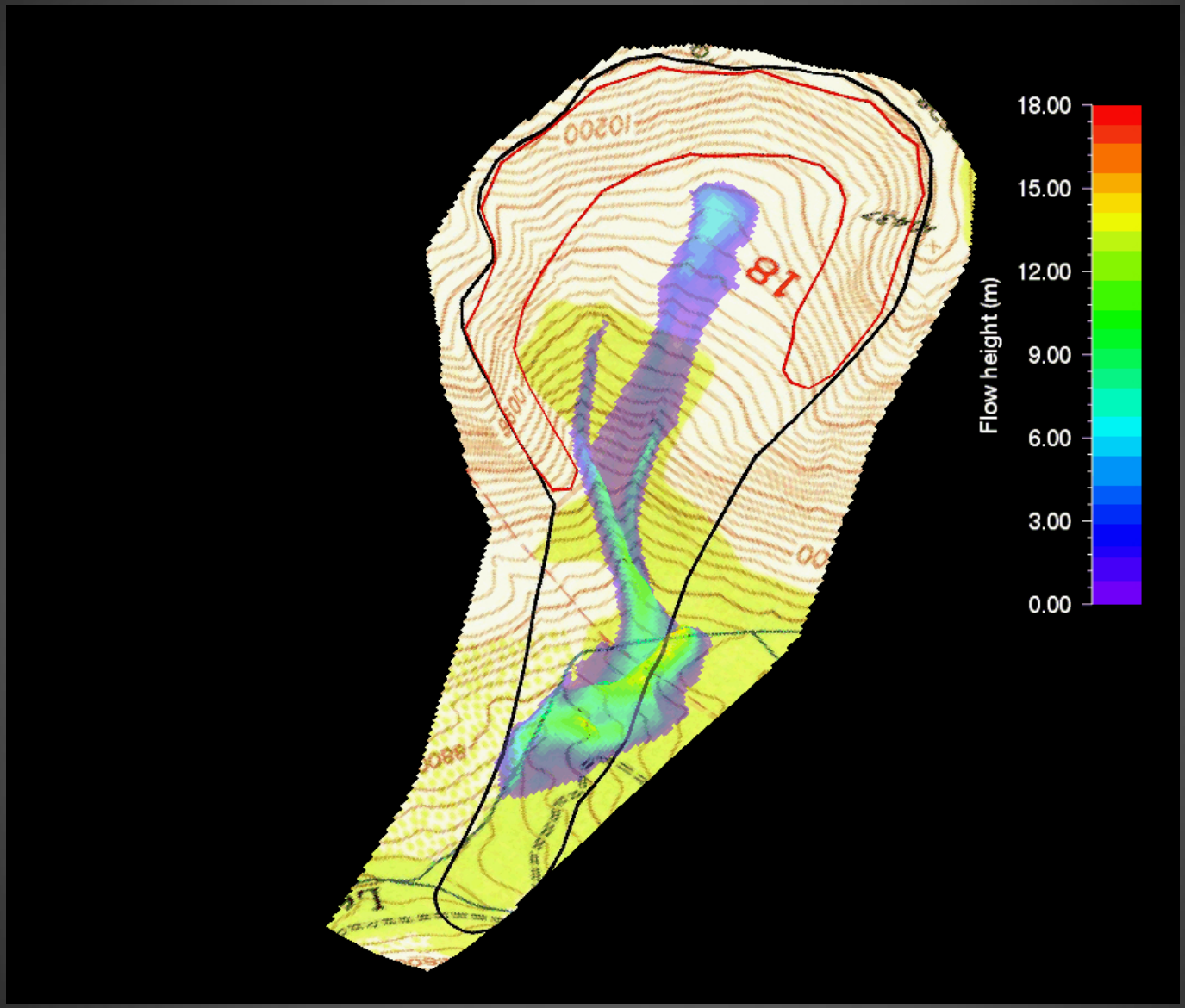
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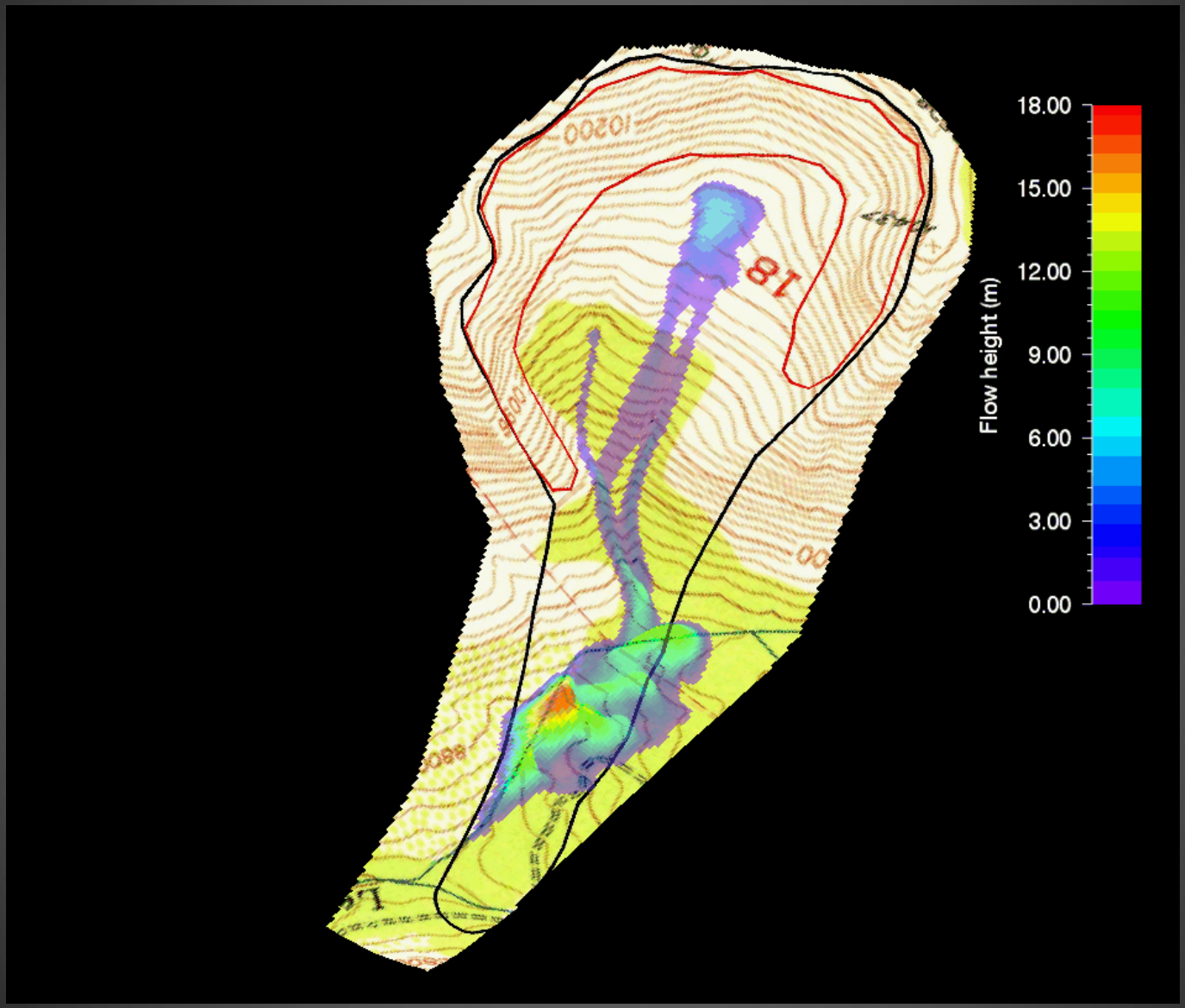
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Flow height (m)

Runout Limit

- Heavy debris, not powder avalanche
- Speculation about extreme runout
- 300-year old Trees mowed down
- Limbs broken off to 10 meters
- Trees uprooted, not snapped off

CONCLUSIONS

- Reasonable Calibration achieved with Colorado Case
- Eastern Sierra Case required very low friction parameters to match runout distance
- Flow directions/trimlines matched well for Colorado Case, but not Eastern Sierra Case
- Model is a useful tool when combined with other methods, experience and judgement

Thank You!

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